



**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

In re Application of

Koichi Ashizawa et al

Art Unit: 1745

Appln. No. : 09/124,925

Ex: T. Dove

Filed July 29, 1998

For Current collector with penetrating holes of complicated shape for use in a secondary battery and manufacturing process thereof (as amended)

**BRIEF ON APPEAL**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA. 22202-3514

Sir:

Pursuant to the provisions of 37 CFR 1.192, submitted herewith is Applicant/Appellants' Brief on Appeal.

**REAL PARTY IN INTEREST**

The real party interest, that is the party that holds the entire right, title and interest in this application is the assignee, Nippon Foil Manufacturing Co., Ltd.

**RELATED APPEALS AND INTERFERENCES**

No appeal or interference is pending in any related application.

**STATUS OF CLAIMS**

Claims 1, 2 and 4 are finally rejected. No claims are allowed.

**STATUS OF AMENDMENTS**

The final rejection was on June 1, 2000. A Request for Reconsideration with Amendment and a Notice of Appeal was filed on December 1, 2000. In the amendment, claim 1 was changed to replace "non-regular" to "complicated." This was

because the examiner held the change of "complicated" to "non-regular" as introducing "new matter" into the application. Also, claim 4 was amended to delete "a given" in line 4.

The amendment to claim 1 (and presumably claim 4 as well) was not entered as indicated in the Advisory Action issued December 18, 2000.

**SUMMARY OF THE INVENTION**  
(page and line references are to the specification)

The present invention relates to a current collector for use in a secondary battery (pg. 1, lines 6 and 7). When coating a surface of a metal foil, such as aluminum foil or copper foil with active material, the metal foil and the active material are difficult to integrate or attach to each other, with the active material dropping out relatively easily. In the preparation of a secondary battery, if a part of the active material, drops out at the time of winding then positive electrode and the negative electrode, there arises a problem of not being able to obtain a secondary battery of a desired capacity. If a part of the active material drops out after the preparation of the secondary battery, there arises another problem that the charge and discharge capacity of the secondary battery is gradually reduced. (pg 1, lines 24 and 25, to pg 2, lines 1-11).

The present invention effectively prevents the active material from dropping out by improving the adherence between each periphery or each inner wall of the penetrating holes and the active material (pg 3, lines 12-15). The current collector according to the present invention is provided with penetrating holes of complicated shape. The invention also relates to a method of producing the current collector (pg 3, lines 20-22).

The current collector according to the present invention satisfies a set of expressions (pg 4, lines 2-4). When these expressions are satisfied, the penetrating holes have no burrs. According to the method, a metal foil is passed between a concavo-convex roll and a smoothing roll under a predetermined pressure. The holes are formed at the given pressure by the plurality of convex parts on the concavo-convex roll. The metal foil with the holes is then passed between a pair of metal smoothing rolls to remove the burrs. (pg 7, lines 24 and 25 to pg 8, lines 1-25).

### **ISSUES**

There are two issues in this appeal, namely, (1) are claims 1, 2 and 4 unpatentable under 35 USC 112, second paragraph as indefinite because of the term "complicated;" and because of incompleteness; and (2) are claims 1, 2 and 4 unpatentable under 35 USC 103(a) over Jenkins.

### **GROUPING OF THE CLAIMS**

Claims 1 and 4 are in independent form, while claim 2 is dependent on claim 1. Claims 1 and 2 are directed to the novel current collector, and claim 4 is directed to the method for producing the current collector.

### **ARGUMENT**

(1)

**The term "complicated" or "non-regular" are definite and in full compliance with the requirements of 35 USC 112 and claim 4 is complete.**

The metallic foils according to the present invention serve as current collectors in, for example, a lithium secondary battery or a lithium-ion battery. The foil desirably has holes (penetrating holes) which penetrate the foil. The hole can have a smooth

surface defining its perimeter or it can have a surface which is not smooth. The term used to describe the "not smooth" surface was originally "complicated." This term was found by the examiner to be objectionable because "[c]omplicated generally means difficult and it is unclear what a complicated or difficult shape encompasses." (Page 4, of the Office Action of October 7, 1999.). To overcome the objection, "complicated" was modified in the specification to "complicated or irregular," and to "non-regular" in claim 1. These modifications, it was believed, would clarify any confusion, which apparently it did not. Still, the condition of "irregular" or "non-regular" is, it is respectfully submitted, clearly shown in Figs 1 and 2, even if it is found nowhere else.

The examiner in the latest Office Action takes the position that "or irregular" in the specification is objectionable, and "non-regular" in claim 1 is rejectable. This leaves applicant with no place to go, except back to "complicated," since, presumably, the illustration in Figs 1 and 2 is not supportive, which in fact they are.

Also, the term "complicated" means more than that which the examiner expresses as her understanding. The term "complicated" could mean "difficult" as suggested by the examiner, and such a meaning would not lend much to and understanding of the surface under consideration. However, "complicated" also means "having many interconnected parts," or "marked by an interrelation of diverse and often numerous parts..." (Webster's Third New International Dictionary, page 465, copy enclosed). Considering these definitions, lends more meaning to the concept of the shape of the surface defining the holes. Couple this with Figs. 1 and 2 and, it is respectfully submitted, no confusion should exist.

It is respectfully submitted, therefore, that the term "complicated" should be accepted if "irregular" is not. In either case, those skilled in the art should have no difficulty in understanding what is intended.

Regarding the shape of the hole, the point is that it is not smooth. See the specification on page 6, lines 19 - 224 which clearly makes the distinction. The holes according to the present invention have a surface which is ***something other than smooth***. What term should be used? The term selected by applicant to identify the surface of the hole was "complicated." If this term is not definite, then applicant should be permitted to choose another term, such as, "non-regular." Applicant should not be told that the surface of the hole cannot be described and therefore the application is fatally defective, but this is precisely what the prosecution of this application has concluded. The term "complicated" is considered "indefinite" and the term "non-regular" is considered as "new matter." Clearly, then, any term other than "complicated" would, employing the examiner's logic, constitute "new matter." Accordingly, if the term originally chosen by applicant to define the shape is not acceptable to the examiner, then no term is. That is not the intent underlying 35 USC 112. If the examiner believes that another term would be more appropriate, applicant is prepared to listen. The procedure is not supposed to be an adversary procedure but an ex - parte procedure. Applicant is willing to change the term to one that is acceptable to the examiner.

To understand claim 4, reference is made to Japanese patent 3-13926. A copy of this patent and an English language abstract are being submitted herewith. Note Fig. 2 of this patent which shows the roll 3 penetrating the foil 1 to form holes. The roll 3 corresponds to a concavo-convex roll like that used in the present invention. All that

is needed is rotation if the roll is configured as a concave-convex roller.

(2)

**Claims 1, 2 and 4 patentably distinguish over Jenkins**

Claim 1 defines a current collector with very specific parameters, namely, two equations which must be satisfied to define the surface shape of the penetrating holes. If these equations are not disclosed in Jenkins et al, it is not seen how Jenkins et al can render claim 1 unpatentable. Jenkins et al has no reason to even contemplate the noted equations, because their holes do not have a complicated or irregular shape. Nor is it proper to suggest that Jenkins et al would contemplate the two equations because they are made with a punch die and not a concavo-convex roller.

A reference which teaches a plate with punched holes is not sufficient, it is respectfully submitted, to render a foil with a plurality of penetrating holes satisfying two specific equations, obvious.

Regarding claim 4, it is the convex parts that create the penetrating holes, and the penetrating holes are those defined in claim 1. Claim 4 is therefore a product-by-process claim and as such enjoys the distinctions noted above relative to claim 1. Jenkins et al. cannot render claim 4 unpatentable in the same way that it cannot render claim 1 unpatentable. Also, Jenkins et al. does not teach the step of passing the metal foil with the penetrating holes formed therein "further through between a pair of metal smoothing rolls" for the purpose of de-burring the penetrating holes at their periphery.

**SUMMARY**

The use of the term "complicated" is not indefinite since it distinguishes the

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surface of the hole from one that is smooth, and those skilled in the art would have not difficulty in understanding what is intended.

The Jenkins et al. patent does not teach the claimed relationships recited, nor the convex parts that create the penetrating holes.

Accordingly, the Board should remand this application to the examiner with a finding that claims 1, 2 and 4 are allowed.

Date: March 30, 2001  
as modified on October 24, 2005

Respectfully submitted,



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## APPENDIX

1. A current collector for use in a secondary battery consisting of a metal foil provided with a plurality of penetrating holes, each of which has a non-regular shape without burrs and satisfies the following expressions:

$$0.05 \leq S \leq 50$$

$$1.30 \leq M/N \leq 100$$

where: S is an area expressed in mm<sup>2</sup> of the penetrating hole, M is a peripheral length expressed in mm of the penetrating hole, and N is a peripheral length expressed in mm of a virtual circle having the area S of the penetrating hole.

2. A current collector for use in a secondary battery according to claim 1, wherein the thickness of the metal foil is in the range of 5 to 100 μm.

Claim 3 (Canceled)

4. A method for producing the current collector of claim 1 for use in a secondary battery, comprising the steps of: passing a metal foil without a hole through between a concavo-convex roll having a plurality of convex parts and a smoothing roll under a given pressure; converting thereby portions of the metal foil without a hole and pressed by the convex parts of the concavo-convex roll into portions with penetrating holes; and passing the metal foil with the penetrating holes further through between a pair of metal smoothing rolls, whereby burrs produced at each periphery of the penetrating holes are removed.





J P 3 - 1 3 9 2.6

TITLE: Manufacture of perforated metal plate

ABSTRACT: To obtain a perforated metal plate without generating a material loss by making a hole by a roll having a lot of projection, turning back its return by a scratching jig, and thereafter, executing a rolling by a roll.

As for a perforating roll 3, a projection 2 is provided in a line in the circumferential direction and the width direction.

A metal plate 1 is fed continuously between the roll 3 and a receiving roll 11. A hole 4 is made by the projection 2, and a return 6 is cut and raised. The metal plate 1 is fed continuously and the return 6 hits against the tip of a scratching jig 5. The return 6 is turned back, and thereafter, rolled by a rolling roll 7. The metal plate 1 is rolled thinly and elongated, and also the return 6 is allowed to gnaw as one body with the metal plate 1, and a perforated metal plate having no burr is obtained. Since there is no punching dust, no material loss is caused, and no burr is generated, therefore, this metal plate can be handled easily.

⑬ Int. Cl. 5

識別記号

庁内整理番号

⑭公告 平成3年(1991)2月25日

B 21 D 28/10  
28/12  
31/02  
35/00

Z

6689-4E  
6689-4E  
6689-4E  
6689-4E

発明の数 1 (全3頁)

⑮発明の名称 孔明き金属板の製造方法

審判 昭62-7741

⑯特 願 昭58-249601

⑰公 開 昭60-133936

⑱出 願 昭58(1983)12月23日

⑲昭60(1985)7月17日

⑳発明者 吉田 宏明 大阪府門真市大字門真1048番地 松下電工株式会社内  
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 ㉓代理人 弁理士 石田 長七

審判の合議体 審判長 佐々木 晴康 審判官 澁井 有 審判官 影山 秀一

㉔参考文献 実公 昭42-15992 (J P, Y 1)

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## ①特許請求の範囲

1 金属板を連続的に送って多数の突起を有する孔明けローラにて孔を明け、次いで引つかき治具にて孔を明けた返りを折り返し、次いで圧延ローラにて圧延して返りを金属板に食い込ませて全面に亘って均一な厚さにすることを特徴とする孔明き金属板の製造方法。

## 発明の詳細な説明

## 〔産業上の利用分野〕

本発明は金属板の全面に多数の孔が明いた孔明き金属板を連続的に製造するのに用いる技術に関するものである。

## 〔従来の技術〕

従来、金属板の全面に多数の孔を明ける場合、プレス等による打ち抜きによつて行つていたが、打ち抜き屑が出て打ち抜き屑の分だけ材料ロスとなり、また打ち抜いたときばりができるという欠点があつた。

## 〔発明が解決しようとする課題〕

本発明は叙述の点に鑑みてなされたものであつて、本発明の目的とするところは材料ロスなく確実に孔を明けることができると共にばりが出ない孔明き金属板の製造方法を提供するにある。

## 〔課題を解決するために手段〕

本発明孔明き金属板の製造方法は、金属板1を

連続的に送って多数の突起2を有する孔明けローラ3にて孔4を明け、次いで引つかき治具5にて孔4を明けた返り6を折り返し、次いで圧延ローラ7にて圧延して返り6を金属板1に食い込ませて全面に亘って均一な厚さにすることを特徴とする。

## 〔作用〕

金属板1に孔4を明けるとき本来打ち抜き屑となる部分を返り6として形成し、この返り6を孔4以外の部分に折り返して返り6を圧延にて金属板1に食い込ませることができて、打ち抜き屑をなくして材料ロスなく孔明き金属板8ができる。

## 〔実施例〕

3は孔明けローラであつて、外周に多数の鋸歯状の突起2を周方向及び幅方向に列設してある。つまり第1図に示すように外周に鋸歯状の突起2を周方向に全周に亘って設けたものを幅方向に適当な間隔を隔てて複数列設けてある。この孔明けローラ3の上方には孔明けローラ3と平行にゴムローラのような受けローラ11を配置してあり、孔明けローラ3と受けローラ11を転接させてある。孔明けローラ3及び受けローラ11の両端の軸は夫々軸受け板12に回転自在に支持してある。この受けローラ11の前方(金属板1の進行方向を前とする)には引つかき治具5を配設して

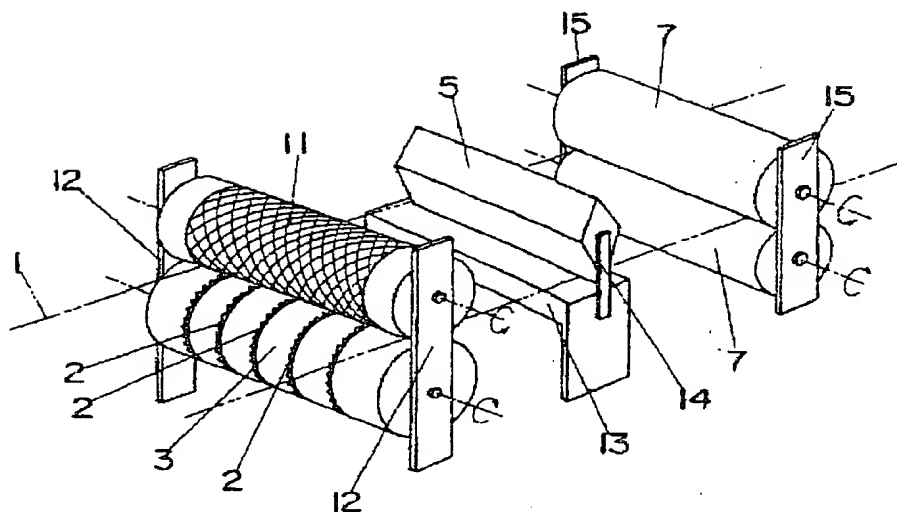
板 9 を形成したとき両面の合成樹脂 10 が孔明け金属板 1 の孔 4 を介して一体につながり、両面の合成樹脂 10 が孔明け金属板 8 の両面に強固に密着し、合成樹脂 10 が剝離しない樹脂被覆金属板 9 が得られる。このようにして形成された樹脂被覆金属板 9 は帯板状である。この樹脂被覆金属板 9 は適当な長さにて切断して建築板として用いたり、また槌状の折り曲げ加工して雨樋として用いたり、その他の種々の用途に用いたりできる。

本発明は叙述の如く金属板に孔明けローラにて孔を明け、引つかき治具にて孔を明けた返りを折り返し、圧延ローラにて圧延して返りを金属板に食い込ませて全面に亘つて均一な厚さにするので、確實に孔が明くのは勿論、孔明けにより生じた返りを金属板に食い込ませてこの返りの材料分だけ余分に金属板を展延できるものであつて、打ち抜き屑が出ず返りを有効利用して材料ロスをなくすることができるものであり、しかもばりが出ず

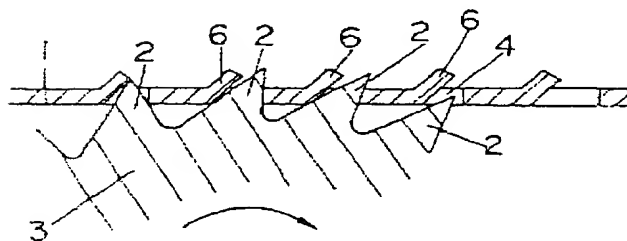
20 次工程での取り扱いがしやすいものであり、さらに圧延するとき孔により伸びのばらつきをなおして均一に圧延できるものである。

第1図は本発明方法を実施する装置の斜視図、第2図は同上の金属板に孔明けローラにて孔を明ける状態を示す断面図、第3図は同上の孔明けローラにて孔を明けた状態の断面図、第4図は孔を明けるときに孔明けローラと受けローラの状態を説明する断面図、第5図aは同上の返りを折り返す状態と圧延状態を示す断面図、第5図bは返りの折り返し状態の断面図、第6図は同上により得られた孔明き金属板を示す断面図、第7図は同上の孔明き金属板に合成樹脂を被覆した状態の断面図であつて、1は金属板、2は突起、3は孔明けローラ、4は孔、5は引つかき治具、6は返り、7は圧延ローラである。

第 1 图

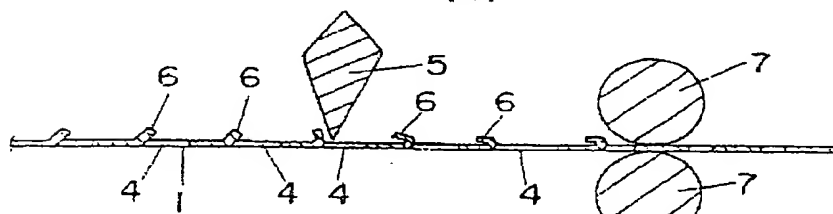


第 2 图

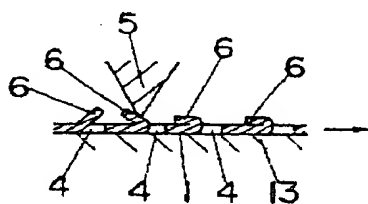


第 5 图

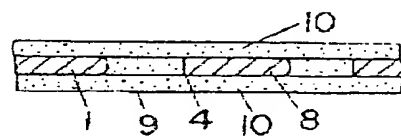
(a)



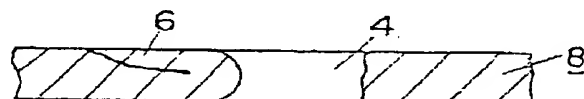
(b)



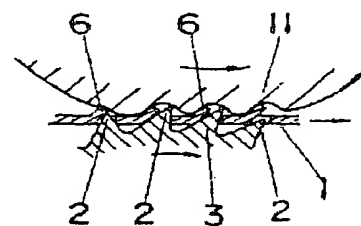
第 7 图



第 6 图



第 4 图





AP JFW

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.: 09/124,925

Group Art unit: 1745

Applicant: Koichi ASHIZAWA et al.

Examiner: T. Dove

Filed: July 29, 1998

Attorney Docket:

ASHI3001/FJD

Title: (As Amended) Current collector with penetrating holes of complicated shape for use in a secondary battery and manufacturing process thereof

**RESPONSE**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

The Communication issued October 5, 2005 is noted.

In response thereto, submitted herewith is a copy of the BRIEF ON APPEAL as originally filed, with the modification noted below, and with the Appendix of the claims filed on December 20, 2004.

The claims in this Appendix include the phrase "non-regular," which was introduced by the amendment filed on March 7, 2000. In reply to this amendment to the claims, the examiner in her final rejection dated June 1, 2000, stated that "Claims 1, 2 and 4 are rejected under 35 USC 112, first paragraph, as containing subject matter which was not described in the specification.....the term 'non-regular' is not described in the specification. It is unclear what 'non-regular encompasses'." In the BRIEF ON APPEAL submitted herewith, this statement by the examiner is discussed, otherwise the Brief is the same. In addition, the format of the Brief is in accord with the format in existence at the time the original Brief was filed.

The matter should now be settled.

No extension fees are deemed appropriate. If one is required, application

U.S. Appl. No. 09/124,925

requests that they be advised before the fee is charged to the undersigned's Deposit Account, which is 02-0200.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Felix J. D'Ambrosio', written in a cursive style.

Felix J. D'Ambrosio  
Reg. No. 25,721

October 24, 2005